

Appl. No. 09/971,940

Amdt. Dated April 12, 2005

Reply to Office Action of January 12, 2005

REMARKS

This is a full and timely response to the non-final Office action mailed January 12, 2005. Reexamination and reconsideration in view of the foregoing amendments and following remarks is respectfully solicited.

Claims 1-35 are pending in this application, with claims 1 and 20 being the independent claims. Claims 1 and 20 have been amended. No new matter is believed to have been added.

Rejections Under 35 U.S.C. § 112, Second Paragraph

At page 2 of this Office Action, claims 1-19 were rejected under 35 U.S.C. § 112, second paragraph, as "being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention." Claim 1 is amended to clarify the claimed subject matter. In particular, claim 1 is amended to correct an inadvertent typographical error and recites "CPU control between a client thread and a server thread". Applicant submits that amended claim 1 is definite. Because claims 2-19 depend from claim 1 or an intermediate claim depending from claim 1, claims 2-19 are likewise definite. From the foregoing discussion, Applicant submits that the rejection of claims 1-19 under 35 U.S.C. § 112, second paragraph, is traversed.

Rejections Under 35 U.S.C. § 102

At page 2 of this Office Action, claims 1-3 and 18-21 were rejected under 35 U.S.C. § 102 as "being anticipated by Ford et al. ("CPU Inheritance Scheduling", hereinafter Ford). This rejection is respectfully traversed because Ford does not disclose all of the elements of the claimed invention.

One concern addressed by the present invention is increasing CPU efficiency while maintaining the benefits of rigid time partitioning when CPU budget is transferred between threads executing in a time-partitioned real-time environment (see Applicant's Specification at page 6, lines 18-20). To that end, the present invention is directed to a budget transfer mechanism that permits budget transfers between any two threads operating at the same rate (e.g., within the same period or frame) (see Applicant's

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Specification at page 7, lines 5-17). Amended claim 1 recites “assigning a CPU budget to said client thread, the CPU budget occurring within a first period [emphasis added]”. The remaining steps recited in amended claim 1 and the step recited in amended claim 20 further detail transfer of CPU control and any unused CPU budget within the time period (i.e., “first period”) of the CPU budget.

In contrast with Applicant’s claimed invention, Applicant submits that Ford does not disclose or suggest a budget transfer mechanism where transfers (i.e., CPU control and unused CPU budget) occur within a CPU budget period. In contrast, Ford discloses a priority inheritance scheduling where threads may temporarily donate “their CPU time to selected threads” in a hierarchical manner. Although Ford mentions that the donating threads may donate CPU time while waiting for clock/timer interrupts (see Ford, page 1, right column, 2nd paragraph), Ford is silent as to any CPU budget period. At best, Ford discloses that the scheduler thread is the overriding control. Applicant submits that Ford teaches contrary to Applicant’s claimed invention because “[t]he basic thread dispatching mechanism necessary to implement this framework does not have any notion of thread priority, CPU usage, or clocks and timers” (see Id.).

At page 3 of the Office Action, an analogy is made between the step of “transferring, within said first period, CPU control and any unused CPU budget to said client thread when said server thread stops executing” recited in amended claim 1 and Ford’s disclosure of preempting a running thread when the scheduler thread wakes up and giving back the CPU to the scheduler thread immediately (see also Ford, page 1, right column, 2nd paragraph). Applicant submits that this analogy is incorrect because Ford does not mention any CPU budget occurring within a first period. Although Ford discloses transferring CPU control, this does not equate to transferring unused CPU budget with the first period. Further, Ford does not indicate that unused CPU budget is transferred back up the hierarchical framework although CPU control of a recipient thread may be terminated by a corresponding scheduler thread.

Because Ford does not disclose transferring CPU control and unused CPU budget with the first period, Applicant submits that amended independent claims 1 and 20 are patentably distinguished from Ford. Because of the foregoing discussion and because

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claims 2, 3, 18, 19, and 21 depend from one of amended independent claims 1 and 20 or an intermediate claim depending therefrom, Applicant submits that claims 2, 3, 18, 19, and 21 are likewise patentably distinguished from Ford.

Rejections Under 35 U.S.C. § 103

At page 5 of this Office Action, claims 4-8, 10, 13-16, 22-26, 28, and 31-34 were rejected under 35 U.S.C. § 103(a) as "being unpatentable over Ford et al. ('CPU Inheritance Scheduling', hereinafter Ford) as applied to claims 1 and 20 above, cited by applicant, in view of applicant's admitted prior art (hereinafter AAPA)." At page 8 of this Office Action, claims 9, 11, 12, 27, and 30 were rejected under 35 U.S.C. § 103(a) as "being unpatentable over Ford et al. ('CPU Inheritance Scheduling', hereinafter Ford) as applied to claims 1 and 20 above, cited by applicant, in view of applicant's admitted prior art (hereinafter AAPA) and further in view of Ryan et al (U.S. Pat. Application Publication 2002/0184381, hereinafter Ryan)." At page 9 of this Office Action, claims 17 and 35 were rejected under 35 U.S.C. § 103(a) as "being unpatentable over Ford et al. ('CPU Inheritance Scheduling', hereinafter Ford) as applied to claims 1 and 20 above, cited by applicant, in view of applicant's admitted prior art (hereinafter AAPA) and further in view of Chan (U.S. 6,466,898)." These rejections are respectfully traversed because the cited references, either alone or in combination, do not disclose or suggest all of the elements of the claimed invention.

As previously submitted hereinabove with regard to Ford, Ford does not disclose a budget transfer mechanism where transfers (i.e., CPU control and unused CPU budget) occur within a CPU budget period. Applicant further submits that the cited references do not disclose or suggest a budget transfer mechanism where transfers occur within a CPU budget period as set forth in amended independent claims 1 and 20. Because of the foregoing discussion regarding the patentability of amended independent claims 1 and 20 and because claims 4-8, 10, 13-16, 22-26, 28, and 31-34 depend from one of amended independent claims 1 and 20 or an intermediate claim depending therefrom, Applicant submits that claims 4-17, 22-34 are likewise patentably distinguished from Ford and AAPA, either alone or in combination.

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Conclusion

Based on the above, amended independent claims 1 and 20 are patentable over the citations of record. The dependent claims are also submitted to be patentable for the reasons given above with respect to the independent claims and because each recite features which are patentable in its own right. Individual consideration of the dependent claims is respectfully solicited.

The other art of record is also not understood to disclose or suggest the inventive concept of the present invention as defined by the claims.

Hence, Applicant submits that the present application is in condition for allowance. Favorable reconsideration and withdrawal of the objections and rejections set forth in the above-noted Office Action, and an early Notice of Allowance are requested.

If the Examiner has any comments or suggestions that could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the below-listed number.

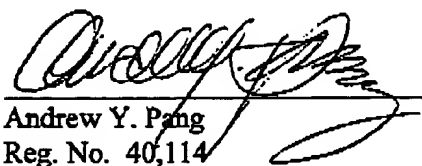
If for some reason Applicant has not paid a sufficient fee for this response, please consider this as authorization to charge Ingrassia, Fisher & Lorenz, Deposit Account No. 50-2091 for any fee which may be due.

Respectfully submitted,

INGRASSIA FISHER & LORENZ

Dated: April 12, 2005

By:


Andrew Y. Pang
Reg. No. 40,114
(480) 385-5060